**3GPP TSG-CT WG3 Meeting #116e C3-213211**

**E-Meeting, 19th – 28th May 2021 (Revision of C3-212346)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.061** | **CR** | **0537** | **rev** | **1** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Updates to support L2TP in RADIUS message flow | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | BEPoP | | | | |  | ***Date:*** | | | 2021-05-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | CT4 has been studied and agreed L2TP supporting for CUPS in WI BEPoP,  TR 29.820 has also concluded to support L2TP tunneling over N6/SGi for 5GC/EPS is to be standardized based on the solution#8 as described in 6.8 in Rel-17, and CT3 scope has been added in WI BEPoP.  Meanwhile, SA2 LS Reply on the support of L2TP with CUPS in rel-17 to support L2TP tunnelling over N6/SGi for 5GS and EPS, with TS 23.214 CR 0076 approved.  Hence the related L2TP support and attributes for RADIUS messages need to be added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding RADIUS attributes according to RFC 2868 and the basic attributes in RADIUS Access-Accept message to support DN AAA server providing L2TP information. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing the RADIUS attributes in the related RADIUS message to support L2TP in this specification, and cannot be referred by TS 29.561. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 16.4.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.214 CR 0076 | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] Void.

[2] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".

[3] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[4] Void.

[5] Void.

[6] Void.

[7] Void.

[8] Void.

[9] Void.

[10] 3GPP TS 27.060: "Packet Domain; Mobile Station (MS) supporting Packet Switched services".

[11] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[12] Void.

[13] Void.

[14] Void.

[15] IETF RFC 768 (1980): "User Datagram Protocol" (STD 6).

[16] IETF RFC 791 (1981): "Internet Protocol" (STD 5).

[17] IETF RFC 792 (1981): "Internet Control Message Protocol" (STD 5).

[18] IETF RFC 793 (1981): "Transmission Control Protocol" (STD 7).

[19] IETF RFC 1034 (1987): "Domain names – concepts and facilities" (STD 7).

[20] Void.

[21a] IETF RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).

[21b] IETF RFC 1662 (1994): "PPP in HDLC-like Framing".

[22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).

[23] 3GPP TS 44.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[24] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[25] IETF RFC 2794 (2000): "Mobile IP Network Address Identifier Extension for IPv4", P. Calhoun, C. Perkins.

[26] IETF RFC 2131 (1997): "Dynamic Host Configuration Protocol".

[27] IETF RFC 1542 (1993): "Clarification and Extensions for the Bootstrap Protocol".

[28] Void

[29] Void.

[30] IETF RFC 3344 (2002): "IP Mobility Support", C. Perkins.

[31] IETF RFC 2486 (1999): "The Network Access Identifier", B. Aboba and M. Beadles.

[32] Void.

[33] Void.

[34] Void.

[35] Void.

[36] Void.

[37] IETF RFC 2290 (1998): "Mobile-IPv4 Configuration Option for PPP IPCP", J. Solomon, S. Glass.

[38] IETF RFC 2865 (2000): "Remote Authentication Dial In User Service (RADIUS)", C. Rigney, S. Willens, A. Rubens, W. Simpson.

[39] IETF RFC 2866 (2000): "RADIUS Accounting", C. Rigney, Livingston.

[40] 3GPP TS 23.003: "Numbering, addressing and identification".

[41] IETF RFC 3576 (2003): "Dynamic Authorization Extensions to Remote Authentication Dial In User Service (RADIUS)", M.Chiba, M.Eklund, D.Mitton, B.Aboba.

[42] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[43] Void.

[44] Void.

[45] IETF RFC 3118 (2001): "Authentication for DHCP Messages", R. Droms, W. Arbaugh.

[46] IETF RFC 3315 (2003) "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", R. Droms, J. Bound, B. Volz, T. Lemon, C. Perkins, M. Carney.

[47] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP".

[48] IETF RFC 2710 (1999): "Multicast Listener Discovery (MLD) for IPv6", S. Deering, W. Fenner, B. Haberman.

[49] IETF RFC 2460 (1998): "Internet Protocol, Version 6 (IPv6) Specification", S.Deering, R.Hinden.

[50] IETF RFC 3162 (2001): "RADIUS and IPv6", B. Adoba, G. Zorn, D. Mitton.

[51] IETF RFC 2548 (1999): "Microsoft Vendor-specific RADIUS Attributes", G.Zorn.

[52] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[53] Void

[54] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[55] Void.

[56] Void

[57] Void.

[58] IETF RFC 1035 (1987): "Domain names – implementation and specification" (STD 13).

[59] Void.

[60] IETF RFC 1771 (1995): "A Border Gateway Protocol 4 (BGP-4)".

[61] IETF RFC 1825 (1995): "Security Architecture for the Internet Protocol".

[62] IETF RFC 1826 (1995): "IP Authentication Header".

[63] IETF RFC 1827 (1995): "IP Encapsulating Security Payload (ESP)".

[64] Void.

[65] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS) Architecture and Functional Description".

[66] Void.

[67] IETF RFC 4005 (2005): "Diameter Network Access Server Application".

[68] 3GPP TS 23.141: "Presence Service; Architecture and functional description".

[69] 3GPP TS 32.422: "Subscriber and equipment trace: Trace Control and Configuration Management".

[70] 3GPP TS 48.018: "Base Station System (BSS) – Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[71] 3GPP TS 23.107: "Quality of Service (QoS) Concept and Architecture".

[72] 3GPP TS 25.346: "Introduction of the Multimedia Broadcast Multicast Service (MBMS) in the Radio Access Network (RAN)".

[73] IETF RFC 4604 (2006): "Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast".

[74] IETF RFC 4607 (2006): "Source-Specific Multicast for IP".

[75] 3GPP TS 29.212: "Policy and Charging Control (PCC); Reference points".

[76] 3GPP TS 29.213: "Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping".

[77] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[78] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[79] IETF RFC 4039 (2005): "Rapid Commit Option for the Dynamic Host Configuration Protocol version 4 (DHCPv4)".

[80] IETF RFC 3736 (2004): "Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6".

[81] 3GPP TS 29.274: "Evolved GPRS Tunnelling Protocol for EPS (GTPv2)".

[82] IETF RFC 4291 (2006): "IP Version 6 Addressing Architecture".

[83] IETF RFC 4862 (2007): "IPv6 Stateless Address Autoconfiguration".

[84] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS)".

[85] IETF RFC 2132 (1997): "DHCP Options and BOOTP Vendor Extensions".

[86] IETF RFC 3361 (2002): "Dynamic Host Configuration Protocol (DHCP-for-IPv4) Option for Session Initiation Protocol (SIP) Servers".

[87] IETF RFC 3646 (2003): "DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".

[88] IETF RFC 3319 (2003): "Dynamic Host Configuration Protocol (DHCPv6) Options for Session Initiation Protocol (SIP) Servers".

[89] IETF RFC 4861 (2007): "Neighbor Discovery for IP Version 6 (IPv6)".

[90] 3GPP TS 23.203: "Policy and charging control architecture".

[91] IETF RFC 4739 (2006): "Multiple Authentication Exchanges in the Internet Key Exchange (IKEv2) Protocol".

[92] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".

[93] IETF RFC 5176 (2008): "Dynamic Authorization Extentions to Remote Authentication Dial In User Service (RADIUS)".

[94] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[95] 3GPP TS 23.380: "IMS Restoration Procedures".

[96] 3GPP TS 29.303: "Domain Name System Procedures; Stage 3".

[97] IETF RFC 4818 (2007): "RADIUS Delegated-IPv6-Prefix Attribute".

[98] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description"

[99] 3GPP TS 23.221: "Architectural requirements".

[100] 3GPP TS 23.682: "Architecture Enhancements to facilitate communications with Packet Data Networks and Applications".

[101] 3GPP TS 29.336: "Home Subscriber Server (HSS) Diameter interfaces for interworking with packet data networks and applications".

[102] IETF RFC 4282 (2005): "The Network Access Identifier".

[103] 3GPP TS 29.275: "Proxy Mobile IPv6 (PMIPv6) based Mobility and Tunnelling protocols; Stage 3".

[104] 3GPP TS 23.007: "Restoration procedures".

[105] 3GPP TS 29.229: "Cx and Dx interfaces based on Diameter protocol; Protocol details".

[106] 3GPP TS 25.446: "MBMS synchronisation protocol (SYNC)".

[107] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".

[108] Void.

[109] IETF RFC 4960 (2007): "Stream Control Transmission Protocol".

[110] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications ".

[111] IETF RFC 6733: "Diameter Base Protocol".

[112] 3GPP TS 23.285: "Architecture Enhancements for V2X services".

[113] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE); MB2 Reference point; Stage 3".

[114] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane of EPC Nodes; Stage 3".

[115] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".

[116] IETF RFC 2869: "RADIUS Extensions".

[m3] IETF RFC 2868: "RADIUS Attributes for Tunnel Protocol Support".

\*\*\* 2nd Change \*\*\*

### 16.4.2 Access-Accept (sent from AAA server to GGSN/P-GW)

Table 2 describes the attributes of the Access-Accept message. See RFC 2548 [51] for definition of MS specific attributes.

Table 2: The attributes of the Access-Accept message

| Attr # | Attribute Name | Description | Content | Presence Requirement |
| --- | --- | --- | --- | --- |
| 1 | User-Name | Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above | String | Optional |
| 6 | Service-Type | Indicates the type of service for this user | Framed | Optional |
| 7 | Framed-Protocol | Indicates the type of protocol for this user | 7 (GPRS PDP Context) | Optional  Note 4 |
| 8 | Framed-IP-Address | IPv4 address allocated for this user, if the AAA server is used to allocate IP address. | IPv4 | Conditional Note 2 |
| 9 | Framed-IP-Netmask | Netmask for the user IPv4 address, if the AAA server is used to allocate IP netmask. | IPv4 | Conditional Note 2 |
| 97 | Framed-IPv6-Prefix | IPv6 address prefix allocated for this user, if the AAA server is used to allocate IPv6 address prefixes. | IPv6 | Conditional  Note 2 |
| 123 | Delegated-IPv6-Prefix | IPv6 prefix delegated to the user. | IPv6 | Conditional Note 6 |
| 96 | Framed-Interface-Id | IPv6 Interface Identifier provided by the GGSN/P-GW to the UE at Initial Attach. | 64 bits as per IETF RFC 3162 [50] | Optional Note 7 |
| 100 | Framed-IPv6-Pool | Name of the IPv6 prefix pool for the specific APN | String | Optional  Note 2 |
| 12 | Framed-MTU | Maximum Transmission Unit of the PDP PDUs, between the MS and GGSN/P-GWs (Note 5) | String | Optional |
| 25 | Class | Identifier to be used in all subsequent accounting messages. | String | Optional (Note 1) |
| 27 | Session-Timeout | Indicates the timeout value (in seconds) for the user session | 32 bit unsigned Integer | Optional |
| 28 | Idle-Timeout | Indicates the timeout value (in seconds) for idle user session | 32 bit unsigned Integer | Optional |
| 26/311 | MS- Primary-DNS-Server | Contains the primary DNS server address for this APN | IPv4 | Optional  Note 3 |
| 26/311 | MS-Secondary-DNS-Server | Contains the secondary DNS server address for this APN | IPv4 | Optional  Note 3 |
| 26/311 | MS-Primary-NBNS-Server | Contains the primary NetBIOS name server address for this APN | IPv4 | Optional  Note 3 |
| 26/311 | MS-Secondary-NBNS-Server | Contains the secondary NetBIOS server address for this APN | IPv4 | Optional  Note 3 |
| 64 | Tunnel-Type | Indicates the tunneling protocol(s) to be used. Value 3 to be used for L2TP tunnel. | As per RFC 2868 [m3] clause 3.1. | Optional  NOTE x1 |
| 65 | Tunnel-Medium-Type | Indicates which transport medium to use when creating a tunnel for those protocols (such as L2TP). Value 1 for IPv4 and/or value 2 for IPv6 to be used when the Tunnel-Type value 3 for L2TP tunnel is present. | As per RFC 2868 [m3] clause 3.2. | Optional  NOTE x2 |
| 67 | Tunnel-Server-Endpoint | Indicates the address of the server end of the tunnel. | As per RFC 2868 [m3] clause 3.4. | Optional  NOTE x2 |
| 69 | Tunnel-Password | Indicates the password to be used to authenticate to a remote server. | As per RFC 2868 [m3] clause 3.5. | Optional |
| 83 | Tunnel-Preference | Indicates the relative preference assigned to each tunnel, If more than one set of tunneling attributes is included. | As per RFC 2868 [m3] clause 3.8. | Optional  Note y |
| 26/10415 /17 | 3GPP-IPv6-DNS-Servers | List of IPv6 addresses of DNS servers for this APN | IPv6 | Optional  Note 3 |
| NOTE 1: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message  NOTE 2: IPv4 address and/or IPv6 prefix attributes shall be present.The IP protocol version for end-user and network may be different.  NOTE 3: Depending on IP address(es) allocated to the user, either or both IPv4 and IPv6 address attributes shall be present.  NOTE 4: Framed-Protocol value of 7 is used by both GGSN and P-GW when interworking with RADIUS AAA servers. When used for P-GW, it represents the IP-CAN bearer.  NOTE 5: In network deployments that have MTU size of 1500 octets in the transport network, providing a link MTU value of 1358 octets to the MS as part of the IP configuration information from the network will prevent the IP layer fragmentation within the transport network between the MS and the GGSN/P-GW. Link MTU considerations are discussed further in Annex C of 3GPP TS 23.060 [3].  NOTE 6: Delegated IPv6 prefix shall be present if the user was delegated an IPv6 prefix.  NOTE 7: As per subclause 9.2.1.1 of 3GPP TS 23.060 [3] and subclause 5.3.1.2.2 of3GPP TS 23.401 [77] the UE shall use this interface identifier to configure its link-local address, however the UE can choose any interface identifier to generate its IPv6 address(es) other than link-local without involving the network.  NOTE x1: As only Value 3 is supported in this release, the Tunnel-Type may be omitted when the L2TP information is provided.  NOTE x2: Tunnel-Medium-Type may be omitted when the L2TP information is provided. In this case, the SMF can derive the protocol (i.e. IPv4 or IPv6) based on the Tunnel-Server-Endpoint.  NOTE y: If more than one set of "Tunneling" attributes are provided, the "Tunnel-Preference" attribute may be provided in each set to identify the relative preference. | | | | |

NOTE: The other optional attributes starting with "Tunnel-" attributes can be referred to the IETF RFC 2868[m3] with implementation specific.

Editor’s Note: Whether the Tunnel-Password can be included is confirmed by SA3.

\*\*\* End of Changes \*\*\*